WHAT IS CLAIMED IS:

1. A bidirectional optical communication module comprising:

an input waveguide for inputting an optical signal;

a reflector having a reflective groove formed by a photolithography process, the reflective groove extending from one end surface of the bidirectional optical communication module to a connection waveguide,

a reflective layer formed on a base surface of the reflective groove, to reflect the optical signal inputted from the input waveguide; and

an output waveguide for outputting the optical signal reflected by the reflector,

wherein the connection waveguide is configured to transmit the optical signal inputted from the input waveguide to the reflector and output the optical signal reflected by the reflector to the output waveguide.

2. The bidirectional optical communication module as set forth in claim 1,

wherein the input waveguide and the output waveguide coupled to the connection waveguide are overlapped so that an angle between the input waveguide and the output waveguide is in the range of 2° to 5°.

3. The bidirectional optical communication module as set forth in claim 2,

wherein a variation of the location of the base surface is limited in the range of an allowance value defined by the following equation:

$$d_0 = \frac{\lambda}{4\pi(n_0 - n_1)} \cos^{-1}(2 \times 10^{-x/10} - 1),$$

wherein d_0 represents the allowance value of the variation of the location of the base surface, λ represents the wavelength of the optical signal, n_0, n_1 represent the effective refractive indices of first and second modes at the connection waveguide where the input and output waveguides are connected, and x represents the loss value for determining an area on which an additional loss is generated.

4. The bidirectional optical communication module as set forth in claim 1,

wherein the input waveguide and the output waveguide coupled to the connection waveguides are overlapped so that an angle between the input waveguide and the output waveguide is in the range of 10° to 40°.

5. The bidirectional optical communication module as set forth in claim 4,

wherein the variation of the location of the base surface is limited in the range of an allowance value defined by the following equation:

$$d_1 = \sqrt{\frac{xw^2\cos^2(\theta_b/2)}{10\log_{10}e\sin^2\theta_b}},$$

wherein d_0 represents the allowance value of the variation of the location of the base surface, x represents the loss value for determining an area on which an additional loss is generated, w represents the half value of a MFD (mode field diameter) of the optical waveguide, and θ_b represents the angle between the input waveguide and the output waveguide.

6. The bidirectional optical communication module as set forth in claim 1, wherein the reflective layer is a metal layer deposited or attached on the base surface formed in the reflective groove.

7. The bidirectional optical communication module as set forth in claim 1, further comprising a multiplexer formed thereon, wherein the input waveguide is coupled to the multiplexer, and the output waveguide is coupled to an optical detector.

8. The bidirectional optical communication module as set forth in claim 1, further comprising a multiplexer formed thereon, wherein the input waveguide is coupled to a light source, and the output waveguide is coupled to the multiplexer,

9. The bidirectional optical communication module as set forth in claim 1, further comprising:

a multiplexer;

a substrate made of silicon or polymer; and

a cladding layer stacked on the substrate,

wherein the multiplexer, the input waveguide, the output waveguide, the connection waveguide, and the reflective groove are formed on the cladding layer.

10. The bidirectional optical communication module as set forth in claim 9, wherein the multiplexer is one of a directional coupler, a multi mode interferometer, and an arrayed waveguide grating.

11. A bidirectional optical communication module, comprising:

a multiplexer connected to a first waveguide for outputting or inputting a multiplexed optical signal and two or more second waveguides for inputting or outputting a demultiplexed optical signal;

a reflective layer, connected to a terminal of one waveguide selected from the second waveguides, for reflecting the optical signal; and

a third waveguide for inputting the optical signal to the reflective layer or outputting the optical signal reflected by the reflective layer,

wherein the reflective layer is formed on a base surface formed in a reflective groove formed by a photolithography process such that the groove is extended from one end surface of the bidirectional optical communication module.

12. The bidirectional optical communication module as set forth in claim 11, further comprising:

a light source formed on a terminal of another waveguide selected from the second waveguides; and

an optical detector formed on a terminal of the third waveguide.

13. The bidirectional optical communication module as set forth in claim 11, further comprising:

an optical detector formed on a terminal of another waveguide selected from the second waveguides; and

a light source formed on a terminal of the third waveguide.

14. The bidirectional optical communication module as set forth in claim 11, further comprising a connection waveguide for inputting the optical signal to the reflective layer or outputting the optical signal reflected by the reflector,

wherein the one waveguide selected from the second waveguides and the third waveguide are overlapped at a predetermined angle at a terminal of the connection waveguide.

15. The bidirectional optical communication module as set forth in claim 14,

wherein the input waveguide and the output waveguide coupled to the connection waveguide are overlapped such that an angle between the input waveguide and the output waveguide is in the range of 2° to 5°.

16. The bidirectional optical communication module as set forth in claim 15,

wherein the variation of the location of the base surface is limited in the range of an allowance value defined by the following equation:

$$d_0 = \frac{\lambda}{4\pi(n_0 - n_1)} \cos^{-1}(2 \times 10^{-x/10} - 1),$$

wherein d_0 represents the allowance value of the variation of the location of the base surface, λ represents the wavelength of the optical signal, n_0, n_1 represents the effective refractive indices of first and second modes at the connection waveguide where the second and third waveguides are connected, and x represents the loss value for determining an area on which an additional loss is generated.

17. The bidirectional optical communication module as set forth in claim 14, wherein the input waveguide and the output waveguide coupled to the connection waveguide are overlapped such that an angle between the input waveguide and the output waveguide is in the range of 10° to 40°.

18. The bidirectional optical communication module as set forth in claim 17, wherein the variation of the location of the base surface is limited in the range of an allowance value defined by the following equation:

$$d_1 = \sqrt{\frac{xw^2\cos^2(\theta_b/2)}{10\log_e \sin^2\theta_b}},$$

d_0 represents the allowance value of the variation of the location of the base surface, x represents the loss value for determining an area on which an additional loss is generated, w represents the half value of a MFD (mode field diameter) of the optical waveguide, and θ_b represents the angle between the input waveguide and the output waveguide.

19. The bidirectional optical communication module as set forth in claim 11, wherein the multiplexer is one of a directional coupler, a multi mode interferometer, and an arrayed waveguide grating.